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(54) Diaper of pants type

(57) A diaper (1) is comprised of a topsheet (2), a backsheet (3) and an absorbent core (4). Both laterally opposite side zones (14) are tuck-in folded toward a longitudinal centerline (A-A) of the diaper (1) so as to be interposed between front and rear bodies (15, 16) of the diaper (1).

FIG.5

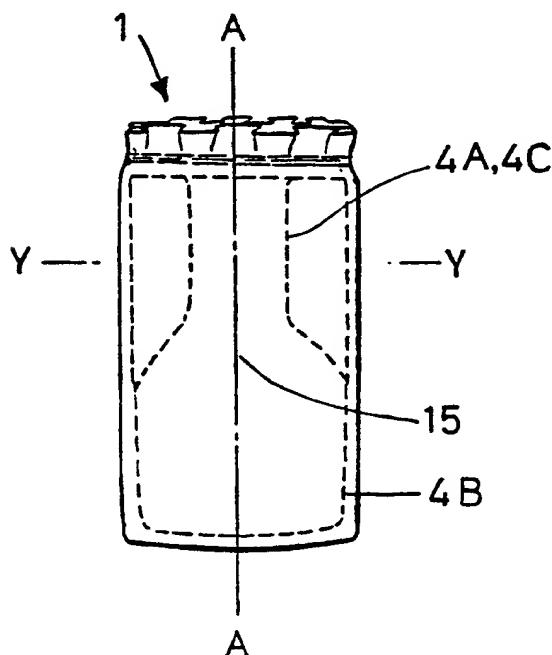
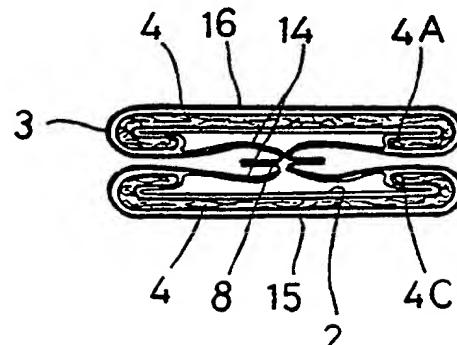
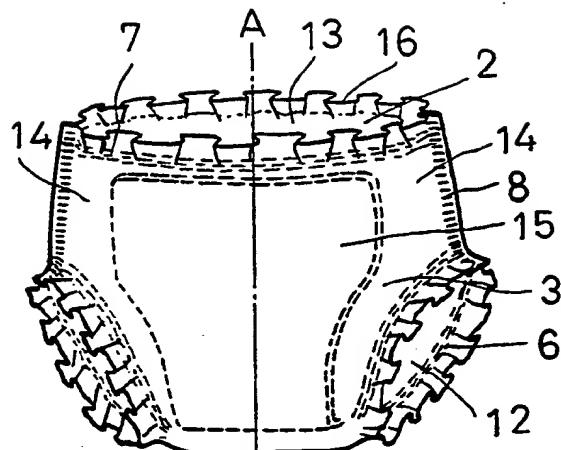
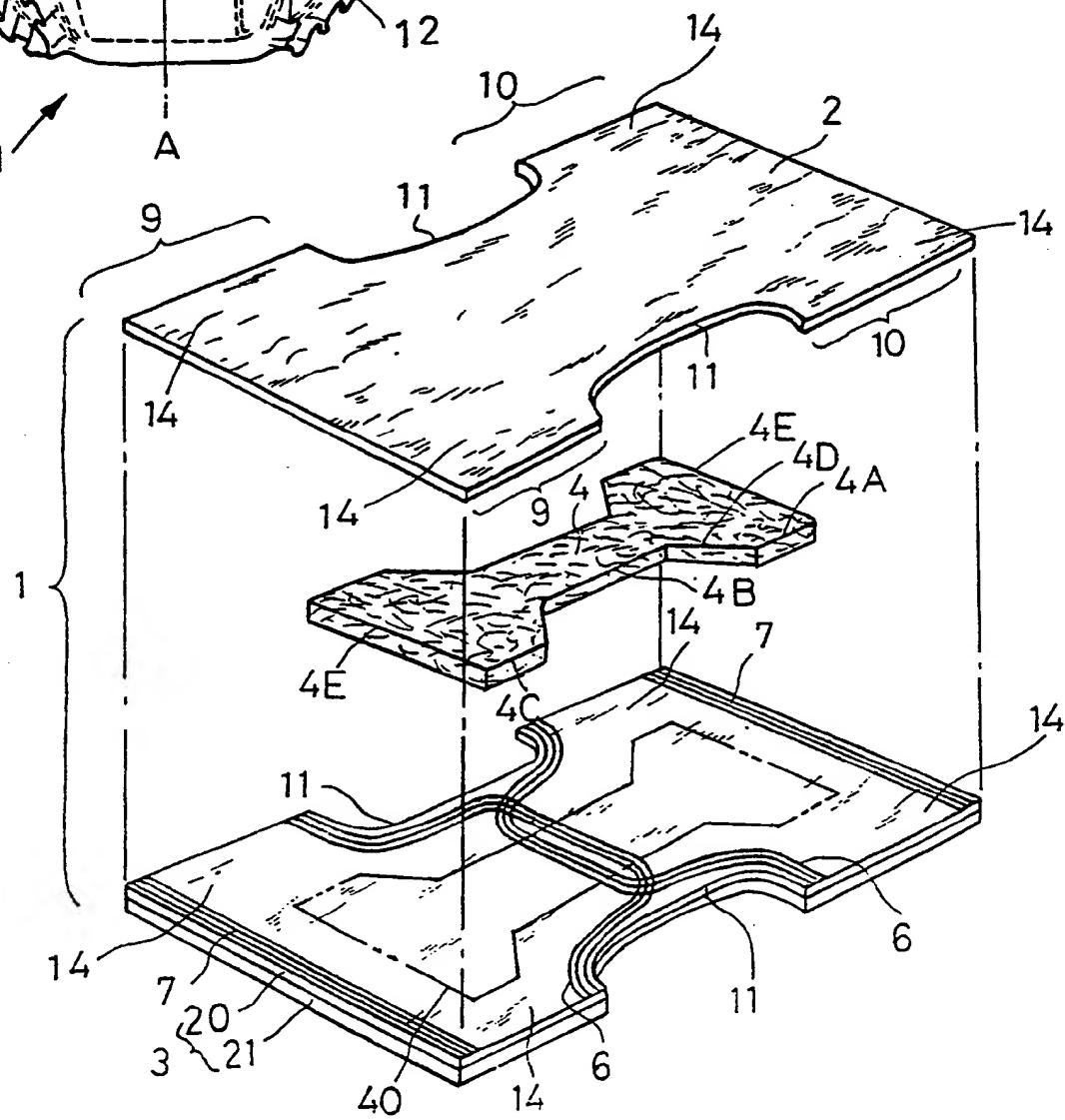
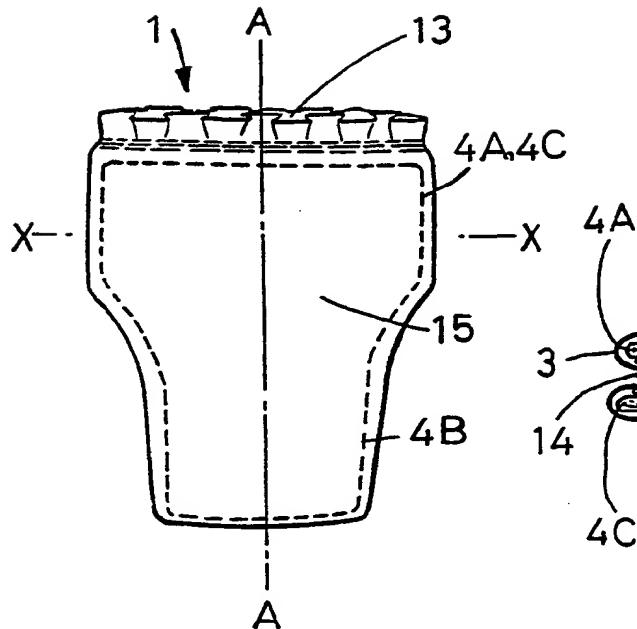
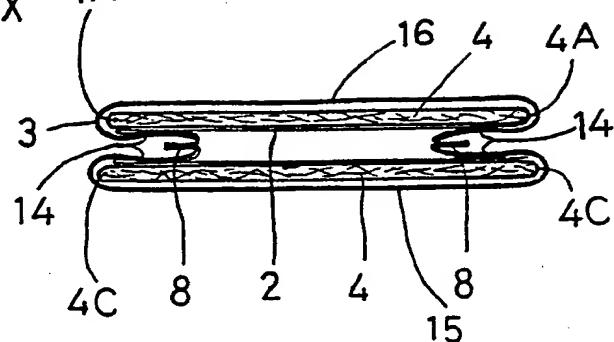
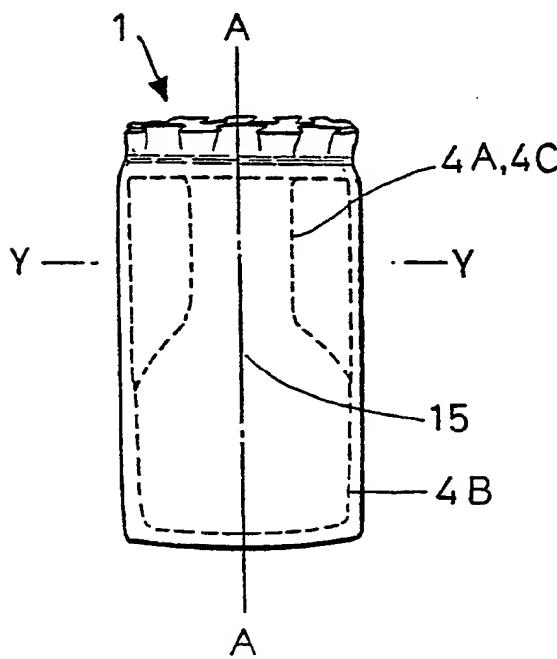
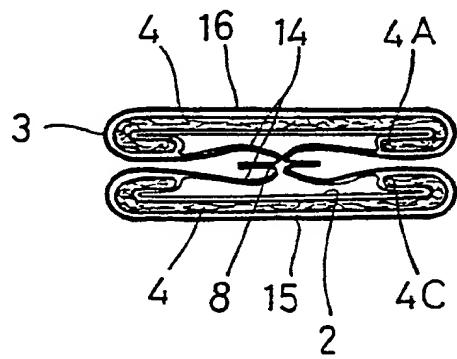


FIG.6



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**FIG.1****FIG.2**

**FIG.3****FIG.4****FIG.5****FIG.6**

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#### DIAPER OF PANTS TYPE

The present invention relates to diaper of pants type basically comprising a topsheet, a backsheet, and an absorbent core sandwiched therebetween, and, more particularly, to such diaper of pants type adapted to be folded with laterally opposite side zones thereof being tucked-in so as to be economically packaged on a production line by a manufacturer as well as to be easily handled by an user.

The diaper comprising, as mentioned above, the topsheet, the backsheet, and the absorbent core sandwiched therebetween has held a leading position in the industry of disposable diaper. Such disposable diaper is generally classified into an open type and a pants type, the latter being recently attracting user's attention due to ease of use.

The diaper of this type often includes elastic members around the waist-hole and the leg-holes so as to form gathers therearound and sometimes utilizes stretchable material as the backsheet in order to obtain good fitness when the diaper is put on. Such diaper, in its restriction-free state, tends to become an ill-shaped mass due to contraction of the respective members and materials. To overcome this problem, a prior art packaging technique

having been employed on a production line is to arrange the individual products as flatly as possible so that a plurality of products may be easily stacked one upon another and then packed in a bag or a box.

With said diaper of pants type having the absorbent core sandwiched between the top- and backsheet, it has been difficult to obtain a neat external appearance of each package reminding purchasers of valuable commodities, because such diaper tends to become an ill-shaped mass due to bulkiness of the absorbent core and contraction of the elastic members provided around the waist-hole and the leg-holes. This problem is more serious when the topsheet and/or the backsheet is made of stretchable material. To arrange such diaper as flatly as possible, a packaging operation on a production line has inconveniently required not only a complex equipment but also much labor.

Flatly arranging the diaper of pants type has inevitably resulted in a complicated engagement of the front body with the rear body along the waist-hole and, therefore, when the diaper is put on, not only has it been difficult to discover the waist-hole but also separation of the front and rear bodies of the diaper from each other with the peripheral edge of the waist-hole being held between the user's fingers has usually taken much time.

Accordingly, it is an object of this invention to solve the above-mentioned problem by providing the diaper of pants type folded with laterally opposite side zones being tuck-in folded so as to be easily packaged in a neat external appearance.

The object set forth in the above is achieved, in accordance with the invention, by providing diaper of pants type including at least a topsheet, a backsheet, and an absorbent core sandwiched therebetween, wherein laterally opposite side zones of said diaper extending from a waist-hole to respective leg-holes are tuck-in folded toward a longitudinal centerline of said diaper so as to be interposed between front and rear bodies of said diaper. According to another aspect of the invention, tuck-in folding of said side zones occur along at least a portion of each side edge of said absorbent core.

In accordance with the present invention, with the laterally opposite side zones being tuck-in folded between the front body and the rear body along at least a portion of each side edge of the bulky and rigid absorbent core, the diaper folded in this manner obtains its external shape defined and stabilized by the absorbent core which is relatively deformation-resistant. Such arrangement also permits a plurality of diapers to be easily stacked and

neatly packed in a bag or a box, thereby allowing a packaging operation to be quickly achieved using a relatively simple packaging equipment. Moreover, the waist-hole can be easily opened when it is desired to put the diaper on, because the front body and the rear body have been separated from each other in advance.

Other features and advantages of the invention will be apparent from the following more detailed description of the preferred embodiments, taken in conjunction with the accompanying drawings, which illustrate by way of example the principles of the invention.

In the drawings:-

Fig. 1 is a perspective view showing, by way of example, so-called diaper of pants type;

Fig. 2 is an exploded perspective view of the diaper shown by Fig. 1;

Fig. 3 and 4 are perspective and end views, respectively, showing an embodiment of diaper constructed according to the invention; and

Fig. 5 and 6 are perspective and end views, respectively, showing another embodiment of diaper constructed according to the invention.

Fig. 1 illustrates so-called diaper 1 of pants type to which the invention generally relates and this diaper 1 comprises, as shown, a topsheet 2, a backsheet 3 and an absorbent core 4 (see Fig. 2) sandwiched therebetween. The diaper 1 further comprises rubber threads 6 used as elastic members for respective leg-holes and rubber threads 7 used as elastic member for a waist-hole. Laterally opposite side zones 14 have their side edges sealed by respective hot melt seal lines 8.

Fig. 2 is an exploded perspective view schematically showing configurations of respective components to be assembled into the diaper 1 shown by Fig. 1 i.e., the topsheet 2, the backsheet 3 having a substantially same size as that of said topsheet 2 and the absorbent core 4 of hourglass shape as usually employed for a disposable diaper. The absorbent core 4 is intermittently bonded onto the rear side of the topsheet 2 by means of hot melt adhesive (not shown) and the backsheet 3 is placed on the topsheet 2 so as to cover said absorbent core 4. The backsheet 3 is bonded to the topsheet 2 by means of hot melt adhesive (not shown) along their peripheral edges. The elastic members 6, 7 are intermittently bonded, under their stretched condition, onto the surface of the backsheet 3 that faces the topsheet 2 by means of hot melt adhesive (not shown). Upon completion of such bonding of the elastic members 6, 7, the diaper is

folded in two along a substantially middle line longitudinally of the diaper with longitudinal side edge portions 9, 10 being brought together and these side edge portions 9, 10 thus brought together are heat sealed by the respective heat seal lines 8 (see Fig. 1) to obtain a complete diaper, whereupon respective cuts 11 formed in the top- and backsheets 2, 3 form respective leg-holes 12 (see Fig. 1) and the elastic members 6 form gathers around outer peripheries of the respective leg-holes 12. It should be understood that the formation of such gathers is covered by the scope of the invention and, therefore, any further detail thereof is not described herein. Similarly, the elastic members 7 associated with longitudinally opposite ends of the diaper form together a waist-hole 13 (see Fig. 1). The absorbent core 4 is an hourglass-shaped profile having longitudinally extending side edge portions 4A, 4B, 4C, oblique side edge portions 4D and transverse edges 4E.

Concerning materials for the diaper 1, the topsheet 2 may be made of liquid-permeable non-woven fabric formed from thermoplastic fibres of polyethylene, polypropylene or the like and the absorbent core 4 may be made of fluffy pulp containing 10% by weight of super water absorptive polymer powder. The backsheet 3 may be made of stretchable waterproof plastic film 20 and stretchable non-woven fabric 21 formed from thermally crimped polyethylene/polypropylene

conjugated fibres, both being intermittently bonded together by means of hot melt adhesive (not shown). As will be apparent from the exploded perspective view of Fig. 2, the absorbent core 4 is dimensioned so as to occupy only respective central zones of the topsheet 2 and the backsheet 3. Two-dot-chain line 40 indicates the size of the absorbent core 4 as viewed in projection onto the backsheet 3.

In the diaper 1 constructed as has been described above, the laterally opposite side zones 14 extending from the waist-hole 13 to the respective leg-holes 12 comprise the top- and backsheets 2, 3 and no absorbent core 4. Really, the diaper 1 tends to assume the appearance of an ill-shaped mass due to not only the bulkiness of the absorbent core 4 folded in two substantially along the middle line longitudinally of the diaper 1 but also contraction of the elastic members, the backsheet 3 and the other elastic components. In view of this, Fig. 1 illustrates the diaper 1 as being stretched so that the configuration of the diaper 1 may be easily understood.

Figs. 3 and 4 show an embodiment of the diaper constructed according to the invention which corresponds to the diaper 1 shown by Fig. 1, wherein the laterally opposite side zones 14 extending from the waist-hole 13 to the respective leg-holes 12 are tuck-in-folded toward a

longitudinal centerline A-A with the respective hot melt seal lines 8 ahead and interposed between the front body 15 and the rear body 16. The diaper 1 thus folded has an outline following the profiled absorbent core 4 and comprises the planar front body 15 on the upper side, the planar rear body 16 on the bottom side and the absorbent core 4 sandwiched therebetween. Thus, the entire external shape of the diaper is defined by the relatively rigid absorbent core and, therefore, it is easy to stock a plurality of individual diapers. In this manner, it is also easy to pack the diapers in a bag or a box on the production line. Additionally, the thickness of the tuck-in folded zones 14 separate the front body 15 and the rear body 16 from each other so that the location of the waist-hole 13 becomes distinct and an user can easily open the waist-hole 13 with the peripheral edge of the waist-hole 13 being held between the user's fingers.

If the diaper 1 is compressed directly from the condition of Fig. 1 to flatten it and both of the side zones 14 are folded on the front body 15, the front and rear bodies 15, 16 would be brought into complicated engagement with each other along the waist-hole 13 and the configuration of the waist-hole 13 would be indecently disturbed, so time and labor required to open the waist-hole 13 would be much more than in the case of the diaper

provided by the invention.

Referring to Fig. 5, another preferred embodiment of the invention is illustrated. The diaper 1 is tuck-in folded in the manner similar to the embodiment shown by Figs. 3 and 4 but the laterally opposite side zones 14 are tucked-in along the side edge portions 4B of the absorbent core 4. The pair of laterally opposite side edge portions 4B define the most narrow zone of the absorbent core 4. Accordingly, wide zones extending along the longitudinally opposite edges 4E, respectively, of the hour-glass-shaped absorbent core 4, i.e., zones adjacent the side edge portions 4A, 4C, respectively, are also tucked-in together with said laterally opposite side zones 14 between the front body 15 and the rear body 16.

Fig. 6 is an end view taken along a line Y-Y in Fig. 5, showing the zones extending adjacent the side edge portions 4A, 4C, respectively, of the absorbent core 4 having been tucked-in together with the laterally opposite side zones 14.

Such manner of tuck-in folding as shown by Figs. 5 and 6 allows the diaper to be arranged substantially in a rectangular shape as viewed in Fig. 5, thereby, in addition to the advantages achieved by the Embodiment 1, further facilitates the packaging thereof and improves its external appearance.

CLAIMS

(1) A diaper of pants type including at least a topsheet, a backsheet, and an absorbent core sandwiched therebetween, wherein laterally opposite side zones of said diaper extending from a waist-hole to respective leg-holes are tuck-in folded toward a longitudinal centerline of said diaper so as to be interposed between front and rear bodies of said diaper.

(2) The diaper as claimed in Claim (1), wherein tuck-in folding of said side zones occur along at least a portion of each side of said absorbent core.

(3) A diaper of pants type substantially as herein described with reference to Figs. 3 and 4 or 5 and 6 of the accompanying drawings.